REMARKS

Applicants respectfully request reconsideration of the issues raised in the final rejection set forth in the Office Action of May 11, 2004, in view of the foregoing amendments and the following remarks. Claims 1, 3, 6, and 8 have been amended. Claim 2 has been canceled. Claims 1, 3-10, and 27 are currently pending.

Applicants are submitting concurrently herewith, a Request for Continued Examination (RCE) and a Request for a Two-Month Extension of Time along with the requisite fees.

1. Anticipation Rejection of Claims 1, 2, and 6-8

Claims 1, 2, and 6-8 stand rejected under 35 U.S.C. § 102(b), as allegedly being anticipated by U.S. Patent No. 5,512,491 to Mehkeri *et al.* ("Mehkeri"). Particularly, the Office Action asserts that Mehkeri "discloses removing microbiological contaminants, such as Cryptosporidium (col. 11, line 11), from water with a particulate medium having both surface hydrated active hydroxyl groups (see col. 3, lines 14-15, which in the case of alumina (col. 3, line 11) would be surface Al-OH groups, and a coating of freshly prepared aluminum hydroxide; and this is all that is required by claims 1, 2 and 6-8." 05/11/04 Office Action, page 2. The Office Action then opines that "Applicant should note that the claims merely require the use of a medium which "contains" surface Al-OH groups, and do not preclude the presence [of] additional materials (i.e., the aluminum hydroxide coating) in this medium." *Id.* Applicants respectfully disagree and traverse the instant rejection.

Applicants claimed invention is distinct from an aluminum hydroxide coating as disclosed in Mehkeri. Specifically, amended independent claim 1 and previously presented independent claim 27 both recite "a surface hydrated alumina."[1] A "surface hydrated alumina" denotes a structure comprising surface Al-OH groups that chemically form directly on the surface of an alumina substrate. *See, e.g.*, Applicants' Specification, page 4 ("A preferred aluminium [*sic*] based medium for use in the invention is alumina (Al_2O_3) which is hydrated at the surface so as to form surface Al-OH groups. This material presents a chemically active substrate for the direct adsorption of suitable biological species."). The surface hydrated alumina of the present invention does not depend on any coating process to provide OH groups on the surface of the alumina, *i.e.*, the surface of the alumina has Al-OH groups that act directly in

[1] Independent claim 1 has been amended to include the limitation "alumina" originally recited in dependent claim 2. Claim 2 has been canceled.

adsorption of contaminants. Four exemplary hydration methods are disclosed in Applicants' specification, all of which involve direct chemical interaction at the surface of the alumina. *See id.* at page 8, last paragraph. These hydration methods may be controlled to introduce the desired frequency of Al-OH groups over the surface area. *Id.* at page 9.

To the contrary, Mehkeri teaches forming hydroxyl groups by way of a freshly prepared coating of aluminum hydroxide added to a support, which may be alumina. *See* col. 3, ll. 7-19. Alternatively, Mehkeri teaches CELITE coated with freshly prepared aluminum hydroxide. *Id.* The former example suggests that the hydroxyl groups form on the coating and not directly on the disclosed alumina support substrate. At the very least, Mehkeri does not teach hydrating the surface of the alumina substrate, but rather coating it with "freshly prepared" aluminum hydroxide. The latter example employing a CELITE support is just that, a CELITE substrate, and not an alumina substrate (*see* col. 3, lines 14-15). This CELITE example does not employ alumina. Thus, Mehkeri fails to teach or suggest "a surface hydrated alumina" as claimed.

The Examiner's comments on page 3 of the Office Action appear to have misinterpreted Mehkeri's teachings. For example, the Examiner concludes that the "alumina of the reference medium will inherently have some surface hydrated Al-OH groups" by asserting that Mehkeri "clearly teaches that the base material will have some active hydroxyl groups in its natural form when hydrated (see col. 3, lines 14-15)." (Emphasis in original.) However, such an assertion is not supported, as the cited passage from Mehkeri clearly discusses CELITE and not alumina as the support or "base" material. *See* Mehkeri, col. 3, lines 14-15 (". . . CELITE is moderately effective in this procedure as it contains active hydroxyl groups in its natural form when hydrated . . . .").

It is evident that Mehkeri did not regard uncoated alumina as suitable for use in Mehkeri's invention. In fact, the teaching of Mehkeri is clearly to coat CELITE or alumina with aluminum hydroxide. *See* col. 3, ll. 7-19. This is in distinct contrast to the requirements of the presently claimed invention, which relies upon the presence of an appropriate surface density of Al-OH groups formed directly on the surface of the alumina. *See* independent claim 1 ("contacting the water with a surface hydrated alumina which contains surface Al-OH groups for a time and under conditions such that a proportion of the microbiological contaminants present in the water are absorbed onto said alumina and removed from the water in a sufficient amount to make the water fit for human use or activity.") and independent claim 27 ("contacting the water

with a surface hydrated alumina for a certain period of time and under conditions such that protozoa in the water are absorbed onto the alumina so as to result in a 2 log reduction in the number of protozoa present in the water, the surface hydrated alumina comprising a particle size of about 15 mm to about 0.05 mm and a surface density of Al-OH groups at an average rate of greater than about 1 hydroxyl group per 10 nm^2 of surface area."). Mehkeri fails to teach or suggest the specifics recited in these claim limitations.

The hydration methods used to form the Al-OH groups in the present invention are quite different to the analytical methods taught by Mehkeri. For example, Mehkeri discloses:

> Turning to the details as to the trapping media 4, test have been carried-out using both uncoated CELITE and CELITE which has been treated by exposure to 0.4 millimoles of aluminum hydroxide per gram of CELITE.
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> * * *
>
> The coating procedure in respect of the media used to generate Table 2 was to dissolve an hydroxide, such as aluminum magnesium or iron hydroxide in water and then to impregnate the CELITE with the water. The CELITE is then dried by a flow of air to remove the superficial water and leave the pores impregnated with the hydrated hydroxide. It has been found preferable to use a freshly prepared hydroxide solution, and not one that is over 10 days old to obtain improved results. Mehkeri, col. 6, lines 25-28 and col. 7, lines 19-27.

Mehkeri further teaches that CELITE in particular will trap bacteria and protozoa. *See id.* at col. 11, lines 8-10. Hence, it is the CELITE material which is taught as effective for trapping protozoa and not the surface hydrated alumina of the claimed invention. Moreover, it must be appreciated that whereas the invention of Mehkeri is directed to an analytical procedure, there is absolutely no suggestion that the protozoa when trapped with the CELITE material (or alumina) are trapped in a quantitative manner. Bearing in mind that Mehkeri discloses in essence a concentrating procedure relative to the analyte (protozoa), it is evident that Mehkeri is unconcerned should some of the protozoa not be trapped. However, in the claimed invention as noted above with respect to claims 1 and 27, there must be a reduction in protozoa numbers contained in the water treated such that it is suitable for use in conjunction with humans.

For at least the reasons set forth above, Applicants contend that the rejection of independent claim 1 and all claims dependent therefrom (e.g., claims 6-8) is improper. Applicants respectfully request the Examiner to withdraw the instant rejection.

2. Obviousness Rejection of Claims 3-5, 9, 10, and 27

Claims 3-5, 9, 10, and 27 stand rejected under 35 U.S.C. § 103(a), as allegedly being rendered unpatentable over Mehkeri. Particularly, the Office Action asserts that Mehkeri "discloses the claimed invention with the exception of the surface density of Al-OH groups on the alumina (claims 3-5 and 27) and the particle size of this alumina (claims 9, 10 and 27)." 05/11/04 Office Action, page 2. The Office Action then opines that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to employ alumina having the recited surface density of Al-OH groups, in order to ensure that a sufficient amount of active hydroxyl groups are present to adequately purify the water (see col. 3, lines 2-5)." *Id.* "Also it would have been obvious to one of ordinary skill in the art at the time of the invention was made to employ alumina having the recited particle size, in order to facilitate handling of this material." *Id.* at page 3. Applicants respectfully disagree and traverse this rejection.

As stated in MPEP § 2143, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Finally, if an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Mehkeri fails to teach or suggest all of the recited claim limitations. For example, Mehkeri fails to teach or suggest "a surface hydrated alumina" as recited in independent claims 1 and 27. *See* Remarks § 1, supra. At best, Mehkeri discloses alumina coated with alumina hydroxide, where the aluminum hydroxide supplies OH groups. Mehkeri fails to teach or suggest "contacting the water with a surface hydrated alumina which contains surface Al-OH groups for a time and under conditions such that a proportion of the microbiological

contaminants present in the water are absorbed onto said alumina and removed from the water in a sufficient amount to make the water fit for human use or activity" as recited in independent claim 1. *Id.* Mehkeri fails to teach or suggest "contacting the water with a surface hydrated alumina for a certain period of time and under conditions such that protozoa in the water are absorbed onto the alumina so as to result in a 2 log reduction in the number of protozoa present" as recited in independent claim 27. *Id.*

The Examiner's proposed modifications to Mehkeri are not properly supported. For example, the Examiner relies on col. 3, lines 2-5 of Mehkeri as support the contention that it would have been obvious to "employ alumina having the recited surface density of Al-OH groups, in order to ensure that a sufficient amount of active hydroxyl groups are present to adequately purify the water (see col. 3, lines 2-5)." Yet this passage merely states that ""Active" hydroxyl groups are those capable of forming new bonds with the hydroxyl bridges found within the colloidal carriers." This passage in no way motivates one of ordinary skill in the art to modify Mehkeri's invention to "employ a "surface density of Al-OH groups [that] occurs at an average rate of greater than about 1 hydroxyl group per 10 nm^2 of surface area" as recited in dependent claim 3. Mehkeri is not concerned with the purification of water. *See* Remarks § 1, *supra*. The Examiner provides no support from the prior art that it would have been obvious to "employ alumina having the recited particle size, in order to facilitate handling of this material." This contention is not a convincing line of reasoning to support that the claimed limitation is obvious. Moreover, the limitation at issue is describing "surface hydrated alumina comprising a particle size of about 15 mm to about 0.05 mm" and not alumina in general. The Examiner's proposed modifications are not supported as the prior art does not suggest the desirability of such modifications.

Claims 4, 5, 9, and 10 are not rendered obvious at least because they depend from claims 1 and/or 3.

For the reasons set forth above, Applicants contend that the Examiner has failed to establish a *prima facie* case of obviousness to support the rejection of claims 3-5, 9, 10, and 27. Applicants respectfully request the Examiner to withdraw the instant rejection

3. Conclusion

Applicants respectfully submit that the instant application is in condition for allowance, and such disposition is earnestly solicited. Should the Examiner believe that any patentability

issue remains after consideration of this Supplemental Amendment, the Examiner is invited to contact the Applicants' undersigned representative to discuss and resolve such.

Applicants are submitting herewith a RCE and a Request for a Two-Month Extension of Time along with the requisite fees, thereby extending the period for responding to the outstanding final rejection up to and including October 12, 2004. In the event that a variance exists between the amount tendered and that deemed necessary by the U.S. Patent and Trademark Office to enter and consider this Supplemental Amendment or to maintain the present application pending, please credit or charge such variance to the undersigned's Deposit Account No. 50-0206.

Respectfully submitted,
HUNTON & WILLIAMS LLP

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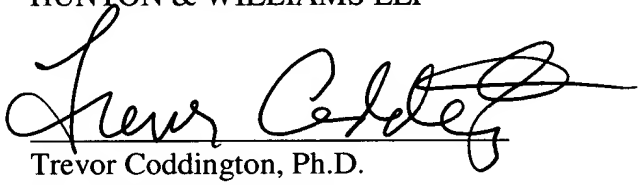
By: 
Trevor Coddington, Ph.D.
Registration No. 46,633

Hunton & Williams LLP
Intellectual Property Department
1900 K Street, N.W., Suite 1200
Washington, DC 20006-1109
(202) 955-1500 (telephone)
(202) 778-2201 (facsimile)